AMENDMENTS TO THE CLAIMS:

The following listing of the claims replaces all prior versions and listings of the claims in the application.

Listing of Claims

1-17. (Canceled)

18. (Previously Presented) A photohydroionization cell comprising:

an ultraviolet light source for providing broad spectrum ultraviolet light in the 100 nm to 300 nm range; and

a one-piece catalytic target structure mechanically coupled to and substantially surrounding the ultraviolet light source, the catalytic target structure including:

a surface that, after contact with ultraviolet light, reacts with hydrate at the surface to form advanced oxidation product, the surface having a repeating V-shaped geometry comprising a plurality of V-shaped pleatings that generally surround a circumference of the ultraviolet light source, the plurality of V-shaped pleatings including: (i) apexes formed by panels of the catalytic target structure that converge to point away from the ultraviolet light source and (ii) tips formed by panels of the catalytic target structure that converge and point towards the ultraviolet light energy source; and

a plurality of holes configured to allow passage of both surrounding gases and a portion of the ultraviolet light through the target structure, wherein the holes are arranged

in rows that extend linearly in a longitudinal direction along the length of the panels that form the apexes and the tips of the plurality of V-shaped pleatings.

19. (Previously Presented) The cell of claim 18, wherein the holes are circular.

20. (Previously Presented) The photohydroionization cell of claim 18, wherein the surface of the catalytic target structure comprises a top portion and a bottom portion for contact with the ultraviolet light provided by the ultraviolet light source for reacting with hydrate at such surface to form advanced oxidation product.

21. (Previously Presented) The photohydroionization cell of claim 20, wherein the surface of the catalytic target structure is designed for substantially maximum catalytic surface contact with the ultraviolet light provided by the ultraviolet light source.

22. (Canceled)

23. (Previously Presented) The photohydroionization cell of claim 18, wherein the surface of the catalytic target structure is designed for contact with ultraviolet light provided by the ultraviolet light source, and wherein such surface of the catalytic target structure comprises catalytic surface area for contact with the ultraviolet light from the ultraviolet light source.

24. (Previously Presented) The photohydroionization cell of claim 23, wherein the catalytic target structure comprises a total surface area that includes said catalytic surface area for contact with ultraviolet light from the ultraviolet light source, and said plurality of holes comprise between 0% and 95% of the total surface area.

25. (Previously Presented) The photohydroionization cell of claim 18, further comprising: a fiber optic cable with a first end oriented to receive light emitted from the ultraviolet light source, and a second end configured to provide an output light signal indicative of the operating status of the photohydroionization cell.

26. (Previously Presented) The photohydroionization cell of claim 25, further comprising: U.V. light filter configured to substantially filter U.V. light, while passing visible light that is visible by a person, the fiber optic cable cooperatively operating with the U.V. light filter to provide the visible light as the output light signal from the second end of the fiber optic cable.

27. (Previously Presented) The photohydroionization cell of claim 26, wherein the U.V. light filter comprises at least one of a U.V. filter, and U.V. filtering material in the fiber optic cable.

28. (Previously Presented) The photohydroionization cell of claim 18, further comprising: a protective barrier substantially encasing the ultraviolet light source, the protective barrier being substantially transparent to UV light for substantially passing UV light emitted from the UV light

source at least within the UV light range in the 100 nm to 300 nm range while at the same time insulating the encased UV light source from external temperature.

29. (Previously Presented) The photohydroionization cell of claim 28, wherein the protective barrier comprises at least one of a protective coating and a tube that substantially encases the UV light source.

30. (Previously Presented) The photohydroionization cell of claim 29, wherein the protective barrier comprises a fluorocarbon protective barrier coating.

31. (Previously Presented) The photohydroionization cell of claim 29, wherein the protective barrier comprises quartz material.

32. (Currently Amended) The photohydroionization cell of claim 29, wherein the protective barrier comprises an anti-fouling external surface that substantially encases the UV light source to deter debris and other contaminants from contacting and adhering to the external surface encasing the UV light source while substantially passing [[W]] UV light emitted from the UV light source at least within the UV light range in the 100 nm to 300 nm range.

33. (Previously Presented) The photohydroionization cell of claim 29, wherein the protective barrier is configured to provide a containment barrier in the event that the UV light source is broken.

34-48. (Canceled)

49. (Previously Presented) A system for the formation of advanced oxidation product, the system comprising:

at least one ultraviolet light source for emitting broad spectrum ultraviolet light in the 100 nm to 300 nm range;

at least one single layer catalytic target structure mechanically coupled to and substantially surrounding the at least one ultraviolet light source, the catalytic target structure including:

a surface for contact by ultraviolet light from the at least one ultraviolet light source that, after contact with ultraviolet light, reacts with hydrate at the surface to form advanced oxidation product, the catalytic target structure having a repeating V-shaped geometry comprising a plurality of V-shaped pleatings that generally surround a circumference of the ultraviolet light source, the plurality of V-shaped pleatings including: (i) apexes formed by panels of the catalytic target structure that converge to point away from the ultraviolet light source and (ii) tips formed by panels of the catalytic target structure that converge and point towards the ultraviolet light energy source; and

a plurality of holes configured to allow passage of both surrounding gases and a portion of the ultraviolet light through the target structure, wherein the holes are arranged in rows that extend linearly in a longitudinal direction along the length of the panels that form the apexes and the tips of the plurality of V-shaped pleatings; and

a fiber optic cable, mechanically coupled with each of the at least one ultraviolet light source, the fiber optic cable including: a first end oriented to receive light emitted from respective each of the ultraviolet light source, and a second end configured to provide an output light signal indicative of the operating status of the system.

50. (Previously Presented) The system of claim 49, wherein the holes are circular.

51. (Previously Presented) The system for the formation of advanced oxidation product of claim 49, further comprising: U.V. light filter configured to substantially filter U.V. light, while passing visible light that is visible by a person, the fiber optic cable cooperatively operating with the U.V. light filter to provide the visible light as the output light signal from the second end of the fiber optic signal.

52. (Previously Presented) The system for the formation of advanced oxidation product of claim 49, further comprising: an adjustable power supply, electrically coupled to the at least one ultraviolet light source, for providing an adjustable electrical power signal thereto.

53. (Previously Presented) The system for the formation of advanced oxidation product of claim 49, further comprising: a UV Photo Detector, optically coupled with the second end of the fiber optic cable, and configured to provide an output signal indicative of an operational status of the at least one ultraviolet light source.

54. (Previously Presented) The system for the formation of advanced oxidation product of claim 53, further comprising:

an adjustable power supply, electrically coupled to the at least one ultraviolet light source, and configured to provide an adjustable electrical power signal thereto; and

a controller, electrically coupled with the adjustable power supply and the UV Photo Detector, configured to, in response to receiving an output data signal from the UV Photo Detector indicative of an operational status of the at least one ultraviolet light source, control the adjustable power supply for providing the adjustable electrical power signal to the at least one ultraviolet light source.

55. (Previously Presented) The system for the formation of advanced oxidation product of claim 54, further comprising: information means, coupled with the controller, configured to, in response to receiving an output data signal from the UV Photo Detector indicative of an operational status of the at least one ultraviolet light source, send an information/alert signal to a user/operator/technical personnel associated with the system.

56. (Previously Presented) The photohydroionization cell of claim 18, wherein a plurality of the plurality of holes are arranged in rows that extend along each of the apexes formed by the panels of the catalytic target structure.

57. (Previously Presented) The system for the formation of advanced oxidation product of claim 49, wherein a plurality of the plurality of holes are arranged in rows that extend along each of the apexes formed by the panels of the catalytic target structure.